OUTBREAK SPOTLIGHT….

"Outbreak Spotlight" is a regularly appearing feature in the *Indiana Epidemiology Newsletter* to illustrate the importance of various aspects of outbreak investigation. The event described below highlights the importance of prompt outbreak investigation and implementation of effective control measures in an institutional setting.

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Background

On February 19, 2004, a local health department (LHD) representative notified the Indiana State Department of Health (ISDH) of a child with laboratory-confirmed shigellosis who attended Child Care Center A. This was the third confirmed case identified at the center. The two earlier confirmed children were siblings, so household exposure was suspected when they were identified. Documented transmission to another attendee of the daycare center fulfilled the definition of an outbreak.

Epidemiologic Investigation

A collaborative investigation of this outbreak was initiated by the ISDH and the LHD. The ISDH developed a questionnaire for children and staff to determine the nature of the illness and identify other possible cases. A case was defined as any previously healthy person associated with Child Care Center A who became ill with diarrhea since February 1. Any person whose illness had another explanation or whose symptoms did not include diarrhea was not considered as a case. The LHD Communicable Disease Director assembled members of the Shigella Outbreak Response Team (SORT). Team members as well as other employees in the Communicable Disease Division attempted to interview each of the 77 individuals identified as an attendee or employee.

Approximately 46 of those interviewed were reported ill. Thirty-eight attendees and staff members met the case definition. Symptoms experienced by the 38 cases included diarrhea (100%), cramps (51%), fever (42%), median temperature: 101.0° F), nausea (40%), vomiting (35%), headache (21%), and bloody diarrhea (16%). Other symptoms reported were body ache and chills.

To identify anyone who may have been asymptomatically shedding *Shigella* bacteria, stool testing of all child care employees and children was initiated as recommended by the ISDH. The LHD provided the child care director with recommendations to control the spread of infection, including exclusion policies, hand washing, adequate disinfection and proper glove use during diaper changes. The childcare director distributed this information to each parent and employee along with notification that stool testing was to be completed by February 23. Anyone with diarrhea was excluded pending laboratory tests, results, treatment, and symptom resolution. Any child or staff member testing positive for shigellosis was

immediately excluded until asymptomatic and five days of antibiotic therapy had been completed or two stool specimens had been submitted and confirmed culture negative.

The LHD continued active surveillance for additional cases of diarrheal illness at Child Care Center A until two incubation periods had elapsed without onset of new cases of shigellosis linked to the center. The Indiana Family and Social Services Administration (FSSA) continued to monitor the facility through unannounced inspections. No additional cases linked to Child Care Center A were found by March 27, so the outbreak was declared over. However, evidence of community transmission was further indicated through May 17 by eight additional cases. These involved two other childcare centers and one school.

Laboratory Results

Initially stool specimens were sought for testing at the ISDH Laboratories. Upon learning that the preservative in the specimen collection kits was only effective for 48 hours after collection, it was not feasible to submit previously collected samples or those scheduled for collection over the weekend. The LHD laboratory director stated that presumptive testing for *Shigella* could be conducted on-site using rectal swabs. This method was used for anyone who had difficulty accessing testing through a physician or clinic. This presumptive test was used on 54 specimens that arrived at the LHD laboratory. All of these results were negative. Twenty-nine stool cultures were tested at local hospitals or clinic laboratories. Nineteen of these cultures tested negative and ten tested positive for *Shigella sonnei*. Four persons were clinically diagnosed with shigellosis.

Environmental Assessment

LHD representatives conducted child care center staff training regarding hand washing and disinfectant recommendations. A LHD representative also made frequent announced and unannounced visits to the facility to review the significance of hand washing as prevention and to inspect the condition of the restrooms, diaper changing areas, and common surfaces and objects. The facility demonstrated inconsistency in following disinfection practices and exclusion policies.

An inspector from the FSSA visited Child Care Center A on April 20, 2004. She cited a number of deficiencies, including soap dispensers being empty or not available at each sink, hand towels and toilet paper not dispensing properly, and toilet seats missing from toilets. Since the facility is designated as a child care ministry, no penalty or follow-up was indicated.

On March 5, 2004, Child Care Center A had undergone a previous inspection with several violations cited, ranging from not changing crib linens daily, staff handling ready-to-eat foods with bare hands, the boys' bathroom floor and wall being heavily soiled, failure to wash children's hands before eating, and staff improperly washing hands during glove use. No enforcement information was available as the provider is not state regulated.

Conclusions

This investigation confirms that an outbreak of shigellosis occurred at Child Care Center A during January-March 2004. The only consistent common exposure among the cases was association with Child Care Center A. The causative agent was *Shigella sonnei*.

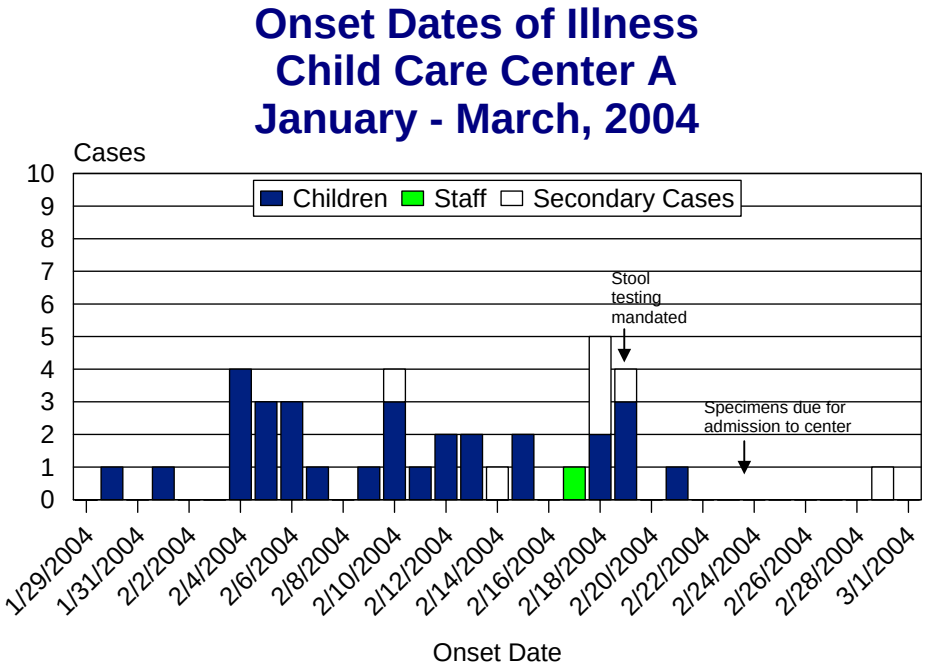
Shigella bacteria are found only in humans and are shed through stool. Symptoms of shigellosis include abdominal cramps, diarrhea (usually containing blood or mucus), nausea, vomiting, and fever. Without appropriate antibiotic treatment, those infected can shed the bacteria as long as one month after symptoms cease.

Transmission occurs through direct or indirect fecal/oral contact, with ingestion of as few as 10-100 organisms. Bacteria can be transmitted through contaminated food or water or person-to-person contact. Foodborne shigellosis outbreaks usually occur when an infected food handler with inadequately washed hands prepares food that is served raw (e.g., salads, vegetables, etc.) or that is handled extensively after cooking (e.g., sliced sandwich meats, rolls, etc.). Person-to-person transmission can occur through direct physical contact or placing contaminated objects in the mouth.

The epidemic curve depicting the onset dates of cases (see Figure 1) indicates that this outbreak occurred most likely via person-to-person transmission. In point-source outbreaks, including foodborne, many cases become ill simultaneously shortly after one particular exposure, such as a contaminated food item, and resolve rather quickly. In propagated outbreaks, including person-to-person, cases become ill at different times, usually in "waves", resulting from exposure to more than one source. Transmission may continue over time within several areas of a facility. This is the pattern observed.

Infection was likely introduced through an ill child or staff member who attended Child Care Center A (see Figure 1). The earliest reported onset date in a child was January 30. Infection can quickly spread, especially in the absence of adequate hygiene, due to the infectious nature of *Shigella* and a small, somewhat closed population.

Figure 1.



To prevent the spread of infection, the Indiana Communicable Disease Reporting Rule 410 IAC 1-2.3 mandates that children diagnosed with shigellosis must be excluded from daycare if they are symptomatic (i.e., have diarrhea and/or vomiting) or test positive for the organism. The CDC defines diarrhea as three or more loose stools in 24 hours. Children may return to the daycare center if they are asymptomatic and have either received five days of antibiotic therapy or have submitted two negative stool cultures. Staff members must be excluded if they are symptomatic or test positive for the organism, and may return only if asymptomatic and have submitted two negative stool cultures at least 48 hours after the completion of any antibiotic therapy. Children and staff who are asymptomatic and awaiting test results or completion of therapy may be cohorted separately from those who are negative or have completed therapy.

In addition to enforcing the Communicable Disease Reporting Rule, several other measures were promptly taken to stop the spread of the outbreak. First, the LHD provided recommendations for prevention, including exclusion policies, hand-washing guidelines, and disinfection, to the child care director. LHD staff visited the facility regularly to ensure that the recommendations were being followed. On the deadline date to submit stool specimens, health department staff members were present during opening hours at the facility to control entry of anyone who had failed to comply with the submission order. If someone arrived still in need of testing, nurses were available on-site to collect samples. Enrollment of new children was suspended until the outbreak was declared over.

The LHD issued notices to the media, schools, local health care providers and surrounding local health departments describing the outbreak. Notification was also sent to other local licensed child care facilities, home daycare providers, and child care ministries. None of the attendee cases had onset dates following the specimen deadline date of February 23. Swift and decisive measures taken by LHD attributed to control of the outbreak.

In general, most person-to-person outbreaks of shigellosis can be prevented by strictly adhering to the following practices:

1. Thoroughly wash hands with soap and water before preparing food, after using the restroom, after diapering children, and before eating.
2. Thoroughly wash hands with soap and water after assisting someone using the restroom or caring for people ill with diarrhea and vomiting.
3. Supervise young children when they are washing their hands.
4. Exclude food handlers or staff having direct care of children while ill with diarrhea or if they are infected with *Shigella*.
5. Exclude children from child care settings while ill with diarrhea or if they are infected with *Shigella*.